

This page contains short answer questions. No explanations are required.

1. (12 points) .

(a) Compute the 25th derivative, $f^{(25)}$, of the function f given by

(i) $f(x) = 10x^9 + 14x^7 - 12x^6 + 2x^5 + 3x^4 - 2x^2 + 5x - 4$

$$f^{(25)}(x) = \underline{\hspace{15em}}$$

(ii) $f(x) = \sin(2x)$

$$f^{(25)}(x) = \underline{\hspace{15em}}$$

(b) For what value of a is $\lim_{h \rightarrow 0} (a^h - 1)/h$ equal to 1?

$$a = \underline{\hspace{15em}}$$

(c) For the function $f(x) = (1.2)^{3x}$, find

(i) $f'(2/3) = \underline{\hspace{15em}}$

(ii) $[f(2/3)]' = \underline{\hspace{15em}}$

2. (8 pts) The function f is an increasing function that is concave down. Fill in each of the blanks with one of the symbols, $<$, $=$, $>$ so that the following statements about f are always true.

(i) $f(2) \underline{\hspace{2em}} f(4)$

(ii) $f'(2) \underline{\hspace{2em}} f'(4)$

(iii) $f''(2) \underline{\hspace{2em}} 0$

(iv) $f(3 + \Delta x) \underline{\hspace{2em}} f(3) + f'(3)\Delta x$